



Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife
Route 135, Westborough, MA 01581
tel: (508) 792-7270, ext. 200; fax: (508) 792-7821
www.state.ma.us/dfwele/dfw/nhesp

DESCRIPTION OF ADULT: The Ocellated Darner is a large, semi-aquatic insect of the order Odonata, suborder Anisoptera (the dragonflies), and family Aeshnidae (the darners). Like all adult dragonflies, the Ocellated Darner has a long, slender abdomen, four wings with dense venation, and a large head with huge eyes and powerful, chewing mouth parts. The Darners are among the largest of the dragonflies, and are further characterized by exceptionally large eyes that wrap around the head and meet along a seam on the top of the head. The Ocellated Darner is dull brown overall with two yellow or greenish spots on the sides of the thorax (winged and legged segment behind the head) and green or greenish-yellow stripes on the top of the thorax. The abdomen is marked with small, dull green to yellow lateral markings. The sexes are similar in appearance, though the pale markings tend to be somewhat brighter and more distinct on males. Both males and females have long, ovate terminal appendages (reproductive structures). The Ocellated Darner is one of two species of spotted darners (*Boyeria*) in North America. Both are readily separated from the other groups of darners by the two pale spots on each side of the thorax.

Ocellated Darners range from about 2.4 to 2.6 inches (60 - 66 mm) in overall length, with a wingspan averaging approximately 3.4 inches (84 - 88 mm).

SIMILAR SPECIES: The Ocellated Darner is very similar in appearance to the closely related, but more common and widespread, Fawn Darner (*B. vinosa*). The two can be reliably differentiated only in the hand, using a combination of characteristics. Ocellated Darners average darker and grayer overall than the paler brown Fawn Darner, with the thoracic markings tending to be more pale green to greenish-yellow (vs. yellow in Fawn Darner) and more oval in shape. Fawn Darners have small, dark patches at the base of the wings, and the wings often have a faint amber wash, both characteristics that are typically lacking in Ocellated Darners. However, all of these characteristics are variable and separation of these two species can be difficult.

The nymphs are long and slender, ranging up to 1.5 inches (38 mm) in length when fully developed. They are dark in coloration with a pale spot on the top of the seventh abdominal segment. They can be identified using various characteristics, as per the keys of Walker (1958), Soltesz (1996), and Needham *et al.* (2000).

Ocellated Darner Dragonfly

Boyeria grafiana

State Status: **Special Concern**

Federal Status: None



© Blair Nikula

HABITAT: Ocellated Darners nymphs inhabit clear, shallow, rocky, swift-flowing streams and large, rocky, poorly vegetated lakes. Adults also inhabit nearby uplands, often forests with mixed coniferous and deciduous trees. In Massachusetts, Ocellated Darners have been found only in shaded, clear, cold, rocky streams and rivers.

LIFE-HISTORY/BEHAVIOR: The males patrol up and down the shoreline, searching for females. They fly low over the water (generally within a foot of the surface), poking in and out of shoreline indentations and projections, circling around protruding rocks and vegetation. Their flight is swift and very erratic, making them difficult to catch. Unlike most odonates, Ocellated Darners are crepuscular and most active late in the day, often flying until well after sunset. They seem to prefer shaded rather than sunlit areas, and are often active on overcast days. Males have been observed patrolling early in the morning in Massachusetts. Unlike many darners, they are rarely seen away from water and apparently do not take part in the feeding swarms typical of most other species in the family. Ocellated Darners have a late flight season, with most records occurring from August to mid-September.

OCELLATED DARNER FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form as these donations comprise a significant portion of our operating budget.

When not flying, the adults rest by hanging vertically from vegetation in woodlands adjacent to their breeding habitats.

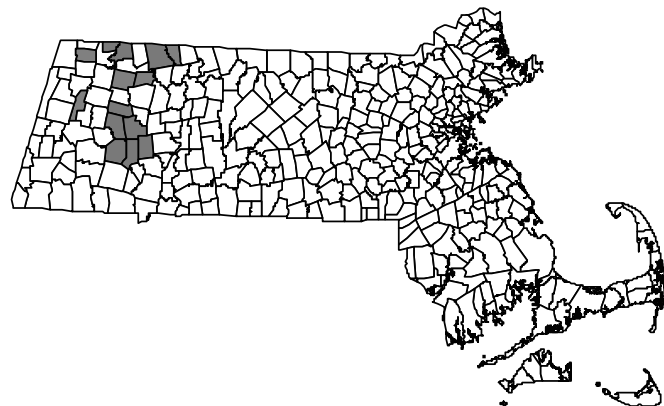
Very little has been published on the life history of Ocellated Darners. However, the closely related Fawn Darner (*B. vinosa*) is better known and presumably the two species share similar life histories. The nymphs are aquatic and seem to spend most of their time clinging upside-down to the underside of rocks and submerged sticks and can often be located by turning over these objects. Darner nymphs are voracious predators and typically are among the dominant predators in their aquatic habitats. Although nothing has been published on the development time of Ocellated Darner nymphs, the nymphs of other species in the family spend anywhere from one to four years developing. When ready to eclose (transform from nymph to adult), the nymphs crawl out of the water onto exposed rocks, emergent vegetation, or shoreline vegetation. After pulling free from their nymphal skin (exuviae), the teneral (the period when the exoskeleton has yet to harden and the flight muscles have not fully developed) adult dragonflies fly off to nearby upland areas where they spend several days feeding and maturing. Adult Darners feed on a variety of aerial insect prey, which they capture in flight with their legs. The legs are lined with spines which allow the dragonfly to securely grasp their prey.

When ready to breed, the males return to their aquatic habitats and take up their shoreline patrols, looking to mate with females. Females are generally not seen at these male-dominated wetlands until the brief period when they are ready to mate and lay eggs. When a male encounters a female, he attempts to grasp her in the back of her head with claspers located on the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the tip of her abdomen upward to connect with the male's sexual organs located on the underside of his second abdominal segment, thus forming the familiar heart-shaped "wheel" typical of all Odonata — the male above and the female below. In this position, the pair flies off to mate, generally hidden high in nearby trees where they are less vulnerable to predators. Females have been observed in Massachusetts dipping their abdomen into the water and mud along river banks, presumably laying eggs. Like other darners, female Ocellated Darners have a long, thin ovipositor projecting from the underside of the end of the abdomen. They use this ovipositor to slice into emergent vegetation and rotting, submerged logs where they lay their eggs. It is not known how long the eggs take to develop into nymphs.

RANGE: Ocellated Darners range through eastern North America from Minnesota, Ontario and Nova Scotia, south to Georgia and Mississippi. The species is fairly common and widespread in Canada and northern New England, but is rather rare and local in the south, where it is confined to higher elevations, primarily in the Appalachians.

POPULATION STATUS IN MASSACHUSETTS: Ocellated Darners are listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, sale, etc...) and sale under the Massachusetts

Endangered Species Act. Most reports to date come from the Green, Deerfield, and Westfield river systems (all tributaries of the Connecticut River). An historical record from Wareham in Plymouth County seems questionable and requires confirmation. The late flight season and inconspicuous habits of Ocellated Darners have likely resulted in populations of the species being overlooked. There are a number of streams and lakes in western Massachusetts that seem to have suitable habitat and further field work will likely reveal additional sites, particularly in Berkshire County.



Distribution in Massachusetts
1977 - 2002

Based on records in Natural Heritage Database

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact needs for management of Ocellated Darners are not known. As with most odonate species, water quality is of primary concern to the well-being of Ocellated Darners. Although the known Massachusetts sites seem to be fairly well-protected, many of these rivers are paralleled by roadways for much of their length, and salt and other road contaminant run-off is of concern. Siltation from construction or erosion may also cause problems. Low-level recreational use from fisherman and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged, and the preservation of remaining undeveloped uplands should be a priority.

REFERENCES:

- Dunkle, S.W. 2000. Dragonflies Through Binoculars. Oxford University Press.
- Needham, J.G., M.J. Westfall, Jr., and M.L. May. 2000. Dragonflies of North America. Scientific Publishers.
- Nikula, B., J.L. Loose, and M.R. Burne. 2003. A Field Guide to the Dragonflies and Damselflies of Massachusetts. Massachusetts Natural Heritage and Endangered Species Program.
- Soltesz, K. 1996. Identification Keys to Northeastern Anisoptera Larvae. Center for Conservation and Biodiversity, University of Connecticut.
- Walker, E.M. 1958. The Odonata of Canada and Alaska, Vol. II. University of Toronto Press.